

POST-MANUAL ADJUSTMENTS IN CALIFORNIAN
LOMATIUM (APIACEAE)

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ABSTRACT

Lomatium observatorium, described herein from Mount Hamilton, California, is the southernmost link in a chain of morphologically similar entities extending through the Coast Ranges to southern Oregon. The first of these to receive taxonomic recognition was *L. ciliolatum*; its former variety is herein raised to specific rank as *L. hooveri* to demonstrate its parity with other members of the alliance. Outside of the alliance, two species of *Lomatium* not included in the Jepson Manual are now known to occur in California: *L. grayi* and *L. hendersonii*.

Even before *The Jepson Manual: Higher Plants of California* appeared in print, it was evident that the text on *Lomatium*, with some 48 taxa the largest genus of California Apiaceae (Constance 1993), was already in need of revision. This article examines the new species and records in preparation for an upcoming second edition.

NEW SPECIES

In 1991, photographer Nigel J. Hancock observed a yellow-flowered umbel growing among the University of California observatory buildings atop Mount Hamilton, Santa Clara Co., California, and brought an excellent photographic slide and fragmentary material to our attention. In his treatment of Apiaceae for the new Jepson Manual, Constance (1993) had previously provided for the three existing voucher specimens from this locality, plus another from nearby Del Puerto Canyon, Stanislaus Co., under *L. ciliolatum* Jepson, with which they more or less agreed in pubescence, by extending the species' range southward. This differed from Sharsmith (1945), who had used at least some of the same specimens as the basis for her inclusion of *L. caruifolium* (Hook. & Arn.) J. Coulter & Rose in her *Flora of the Mount Hamilton Range of California*. As a result of Hancock's discovery of extant populations on Mount Hamilton, new and better material has come to hand. Features of the leaves, fruit, and habitat, as indicated in the accompanying key, make it apparent that a previously undescribed entity is concerned.

Lomatium observatorium Constance & Ertter, sp. nov. (Fig. 1)—
TYPE: USA, California, Santa Clara Co., partly open rocky

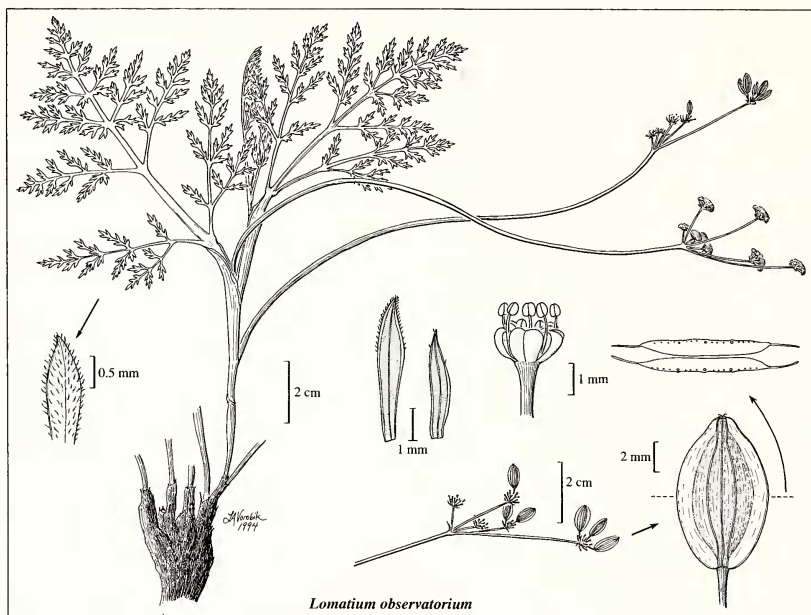


FIG. 1. *Lomatium observatorium*: habit in flower with enlargement of leaf segment showing vestiture; involucel bractlets; flower; infrutescence; fruit with cross-section. From type collection, *Constance and Constance 3902*.

ridge on San Antonio Valley road 1.2 miles below (east of) summit of Mount Hamilton, ca. 1219 m., 23 May 1993, *L. and W. C. Constance 3902* (holotype UC; isotypes to be distributed).

Plantae acaulescentes vel brevicaulescentes puberulae vel dense hirtellae interdum glabratae e radice palari elongatae, scapis florescentibus 1–2; lamina foliorum glauco-viridis late ovata, ternato-bipinnata, divisionibus ultimis lineari-lanceolatis acutis; petioli purpureo-vaginantes; pedunculi folia excedentes; radii fertiles valde inaequales, patenti vel patento-ascendentes; umbellularum flores 6–12, 1–8 fertilibus; involucellae bracteolae lanceolatae vel obovatae \pm ciliolatae, quam flores breviores, basi confluentes; petala et antherae obscure citrinae, ovariis glabris; fructus ovalis glabrous apice basique vix angustatus, costis dorsalibus filiformibus inconspicuis alis quam corpore multo angustioribus; vittae minimae in intervallis et in commissuris pluribus; seminis superficie plana; chromosomatum numerus $n=11$.

Plants acaulescent or subacaulescent, 10–30 cm tall, the herbage puberulent to densely hirtellus, rarely glabrate, from an elongated

taproot up to 15 cm long and bearing 1–8 flowering shoots at summit; leaves inserted at ground level and spreading laterally or ascending, grayish-green, the blade broadly ovate, 4–12 cm long and broad, ternate-bipinnate, the ultimate divisions linear-lanceolate, acute, mucronulate, 1–8 mm long, ca 1 mm broad; petiole 3–6 cm long, wholly sheathing, the sheaths purplish with membranous margins ca 1 mm wide; peduncles 0.8–20 cm long, rather slender, axillary, usually decumbent at base and spreading laterally or spreading-ascending, exceeding the leaves; involucre 0; rays 4–16, only 1–3(–7) developing, 0.8–5(–8) cm long; umbellets usually 8–12-flowered, 1–8 flowers fertile; involucre of 5–10 lanceolate to obovate, venose, very narrowly scarious, \pm ciliolate bractlets 3–4 mm long, usually slightly confluent at base; fruiting pedicels 1–3(–5) mm long; petals dull yellow with a darker central stripe, oblong to obovate, the anthers yellow, the ovaries glabrous; carpophore bipartite, filiform, persistent; fruit oval, 7–10 mm long, 3.5–5 mm broad, scarcely narrowed at apex and base, purplish dorsally, ashy-white on the commissural surface, the ribs filiform, inconspicuous, the lateral wings inconspicuous, ca. 0.6 mm wide, much narrower than the body; vittae very small, several in the intervals and on the commissure, the seed face nearly plane; chromosome number $n=11$.

PARATYPES: USA: CALIFORNIA, Santa Clara Co., type locality, 4 Apr 1993, *Constance, Ertter & Olson 3901* (UC); Mt. Hamilton, 29 Apr 1923, *Eastwood 11675* (CAS), 18 Jun 1941, *Eastwood & Howell 9667* (CAS); rocks near Aquarius road, NE slope at summit of Mt. Hamilton, 10 Mar 1934, *H. K. Sharsmith 583* (UC); Mt. Hamilton, behind 120-inch telescope, rocky flat, 31 May 1993, *Ertter & Willingham 11081* (UC). Stanislaus Co., near head of Del Puerto Canyon, rocky N-facing slope, 20 Apr 1941, *R. F. Hoover 4892* (UC).

Open or partly shaded rocky openings in *Pinus coulteri-Quercus wislizenii-Q. chrysolepis* woodland adjoining *Quercus-Garrya-Ceanothus-Arctostaphylos* chaparral. Substrate consisting of partly metamorphosed sedimentary Franciscan rocks and intruded volcanics, in the Mount Hamilton Range, at an altitude of ca. 1280–1330 m. Blooming March to May; fruiting May to June.

THE *LOMATIUM CILIOLATUM* GROUP

Lomatium observatorium represents a fifth and southernmost member of the *L. ciliolatum* group, which extends from the Lakeview District of south-central Oregon into and southward in the Coast Ranges of northern California (Fig. 2). The northernmost species is *L. peckianum* Mathias & Constance, from Lake and Klamath counties, Oregon, and Siskiyou Co., California. *Lomatium tracyi*

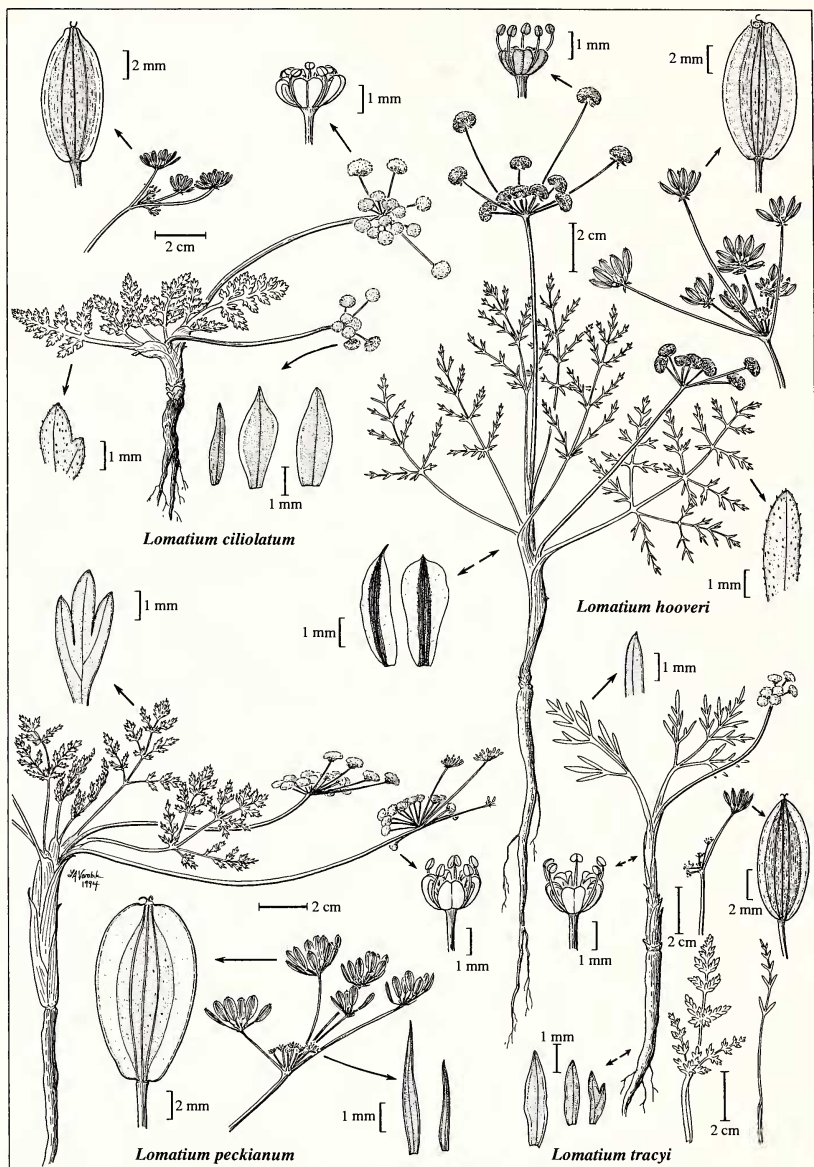


FIG. 2. Clockwise from upper righthand corner: *Lomatium ciliolatum*, *L. hooveri*, *L. tracyi*, and *L. peckianum*. Each showing habit in flower with enlargements of leaf segment showing vestiture, involucre bractlets, and flower; infructescence with enlargement of fruit.

Mathias & Constance is a rare ultramafic endemic of Humboldt, Trinity, Shasta, and Lassen counties, California, while *Lomatium ciliolatum* itself, described by Jepson in 1924, occurs from Trinity Co. to Colusa Co., chiefly in the inner north Coast Ranges. The final element, *L. ciliolatum* var. *hooveri* Mathias & Constance, is herein raised to specific status since its distinctiveness is equivalent to that of the other species. It occurs in Napa, Lake, and Colusa counties.

Lomatium hooveri (Mathias & Constance) Constance & Ertter, comb. et stat. nov. Based upon *Lomatium ciliolatum* var. *hooveri* Mathias & Constance, Bulletin of the Torrey Botanical Club 69: 153. 1942.

In its preference for a volcanic habitat, *L. observatorium* is similar to *L. peckianum*, but that species has glabrous to sparsely scaberulous foliage, broader leaf divisions, and nearly cream flowers. The other three species are all serpentine endemics, *L. hooveri* usually occurring in chaparral while *L. ciliolatum* and *L. tracyi* are mostly found in coniferous forests. *Lomatium hooveri* is further distinctive in its broad white scarious bractlets contrasting sharply with the red-purple petals. *Lomatium ciliolatum* differs from *L. observatorium* in its crowded ciliolate to densely hirsutulous and broad leaf divisions, with flowers either yellow or occasionally (as on Snow and Sheet-iron mountains) bright red. Finally, *L. tracyi* is quite glabrous, with few and generally more slender leaf divisions, narrower bractlets, and mostly only one or very few fertile rays.

In the Jepson Manual, the key to *Lomatium* (Constance 1993) on p. 152 can be modified to include *L. observatorium* as follows:

- 50. Corolla gen yellow; bractlets very narrowly scarious-margined
 - 50a. Ultimate lf divisions broad, obtuse, overlapping; fr oblong, the wings thick; serpentine substrates, inner north Coast Ranges . . . *L. ciliolatum*
 - 50a'. Ultimate lf divisions narrow, gen acute, less crowded; fr oval, the wings thin; volcanic substrates, Mt. Hamilton range *L. observatorium*
- 50'. Corolla purple; bractlets scarious throughout *L. hooveri*

Lomatium ciliolatum, *L. observatorium*, *L. hooveri*, *L. peckianum*, and *L. tracyi* are all low, essentially stemless, taprooted perennials of open or lightly shaded rocky ridges, slopes, or flats. The leaves are frequently glaucous, bluish, or purplish, varying from strictly glabrous to densely hirtellous; they generally either lie flat on the ground or ascend gradually. The inflorescence consists of one or more divergent or spreading flowering scapes bearing few-rayed compound umbels. The flowers vary from pale yellow to bright purplish-red and may be set off by a more or less scarious involucrel, although the latter may be only weakly developed in some instances. The fruits are often shining and narrowly thin- to strikingly thick-

winged. All have been examined cytologically and determined to be diploid with a chromosome number of $n=11$.

We therefore believe that the five species do indeed constitute a natural grouping, even though this conclusion derives no support from unpublished phenetic and cladistic analyses that have been kindly brought to our attention. Karen S. Simmons (1985), working with the late Amy Jean Gilmartin in her pioneering numerical studies of *Lomatium*, set out "to examine the entire genus and to establish putatively closely related groups of *Lomatium* species", admitting, however, that she "was not seeking a fully resolved tree of all *Lomatium* species". In pursuit of her goals, she subjected 13 binary characters, mostly drawn from existing monographs and species descriptions, to phenetic and cladistic analyses, using *Polytaenia* as an outgroup. Other than one well-defined clade that Simmons used as a focus for further studies, the resultant trees failed to agree on the clustering of most other species, including those in the *L. ciliolatum* group.

NEW RECORDS

Bruce Bartholomew (CAS), in conjunction with his work on a flora of Modoc County, has called our attention to the occurrence of two species of *Lomatium* in California which are not currently in the Jepson Manual. These are the Great Basin species *L. grayi* (J. Coulter & Rose) J. Coulter & Rose and *L. hendersonii* (J. Coulter & Rose) J. Coulter & Rose. Both were ostensibly collected in Modoc Co., California, by Mrs. C. C. Bruce in 1899, and re-collected nearly a century later by Bartholomew.

Lomatium grayi is abundant and widespread in the northern Great Basin. In the Jepson Manual it would key to *L. torreyi* (J. Coulter & Rose) J. Coulter & Rose, from which it differs in its broader leaves, the possession of an involucl, longer pedicels, and broader fruit. It is vouchered in California by *Bruce 73* (Modoc Co., Jun 1899; DS) and *Bartholomew 6634* (Surprise Valley, 13 Jun 1993; CAS, UC).

Lomatium hendersonii, largely restricted to central Oregon, belongs to the tuberous group of species monographed by Schlessman (1984). It does not fare well in the Manual key, but would probably place near *Lomatium stebbinsii* Schlessman & Constance, from which it may be differentiated by its much more numerous leaf segments, the presence of an involucl, its longer pedicels, and its much thicker (corky) fruit wings. It is vouchered in California by *Bruce 2491* (high mts., Goose Lake, Aug 1899; DS) and *Bartholomew et al. 6533* (road to West Valley Reservoir, 13 May 1993; CAS, UC).

According to both Schlessman (1984) and Mathias & Constance

(1945), *L. hendersonii* has as a synonym *Leptotaenia leibergii* J. Coulter & Rose (not to be confused with *Lomatium leibergii* J. Coulter & Rose, 1900). Cronquist (1992), however, suspected that more than one entity is involved and proposed the name *Lomatium roseanum* Cronq. as a nomen novum for *Leptotaenia leibergii*. Schlessman (1984) comments that *L. hendersonii* is poorly collected and that it is the only member of the tuberous group of *Lomatium* for which two different chromosome numbers have been reported. Further field work is obviously needed.

ACKNOWLEDGMENTS

The writers are particularly grateful to Linda Vorobik, who designed and executed the excellent illustrations. We are indebted to Mr. Hancock for calling the Mount Hamilton population to our attention, and to Bruce Bartholomew for alerting us to the Modoc County records. We acknowledge the assistance and fellowship of our field companions: William C. Constance, Lynne Hosley, Brad Olson, and Joe Wiltingham. We thank the staff of UC/JEPS and CAS/DS for materials.

LITERATURE CITED

- CONSTANCE, L. 1993. Apiaceae. Pp. 136–166 in Hickman, J. C., (ed.), *The Jepson Manual: higher plants of California*. University of California Press, Berkeley.
- CRONQUIST, A. 1992. Nomenclatural innovations in Intermountain Rosidae. *Great Basin Naturalist* 52(1):75–77.
- MATHIAS, M. E. AND L. CONSTANCE. 1944–1945. Umbelliferae. *North American Flora* 28B:43–295.
- SCHLESSMAN, M. A. 1984. Systematics of tuberous lomatiums (Umbelliferae). *Systematic Botany Monographs* 4:1–55.
- SHARSMITH, H. K. 1945. Flora of the Mount Hamilton Range of California. *American Midland Naturalist* 34(2):289–367. Reprinted 1982 by the California Native Plant Society, Special Publication no. 6.
- SIMMONS, K. S. 1985. Systematic studies in *Lomatium* (Apiaceae). Ph. D. thesis, Washington State University. 228 pp.